IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

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In re Application of: Terry L. Cole, et al.	Examiner: A. Moorthy
Serial No.: 09/901,329	Group Art Unit: 2131
Filed: July 9, 2001	Att'y Docket: 2000.053500
For: SOFTWARE MODEM FOR COMMUNICATING DATA USING ENCRYPTED DATA AND UNENCRYPTED CONTROL CODES	Customer No. 023720

APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants hereby submit this Appeal Brief to the Board of Patent Appeals and Interferences in response to the Final Office Action dated February 7, 2006.

The Assistant Commissioner is authorized to deduct the fee for filing this Appeal Brief ($500.00) and any other fees required under 37 C.F.R. §§ 1.16 to 1.21 from the Williams, Morgan & Amerson, P.C. Deposit Account No. 50 0786/2000.053500.

I. REAL PARTY IN INTEREST

Advanced Micro Devices, Inc., the assignee hereof, is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences of which Applicants, Applicants' legal representative, or the Assignee is aware of that will directly affect or be directly affected by or have a bearing on the decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 1-19 are pending in the case. The Final Office Action rejected each of claims 1-19. No claims have been allowed. There were no objections to the claims.

IV. STATUS OF AMENDMENTS

All previous amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Figure 1 is a simplified block diagram of a communications system in accordance with one illustrative embodiment of the present invention. The communications system 10 includes a user station 20 in communication with a central station 30 over a communication channel 40. In the illustrated embodiment, the user station 20 is a mobile computing device using a software modem 50 to communicate in accordance with a wireless communication protocol, such as GSM. The central station 30 may be a shared base station capable of serving a plurality of subscribers.

The software modem 50 includes a physical layer (PHY) 70 implemented in hardware and a protocol layer 80 implemented in software. The PHY layer 70 converts digital transmit signals into an analog transmit waveform and converts an incoming analog received waveform into digital received signals. For transmit signals, the output of the protocol layer 80 is the transmit "on-air" information modulated about a zero Hz carrier (*i.e.*, a carrierless signal). The PHY layer 70 mixes (*i.e.*, mixing may also be referred to as upconverting) the carrierless transmit signal generated by the protocol layer 80 in accordance with assigned time slot, frequency, and power level assignments communicated to the user station 20 by the central

station 30 to generate the actual analog waveform transmitted by the PHY layer 70. The central station 30 also communicates time slot and frequency assignments to the user station 20 for incoming data. Collectively, the time slot, frequency, and power level (*i.e.*, for transmit data only) assignments are referred to as control codes.

In the communications system 10 of the instant invention, the central station 30 transmits user data in encrypted form and control codes in an unencrypted form. Such an arrangement protects the security of the user data to prevent eavesdropping, but allows the PHY layer 70 to directly read the control codes and configure its transceiver parameters without requiring processing by the protocol layer 80. Hence, if the protocol layer 80 is corrupted by a virus, it may not be commandeered to cause the software modem 50 to broadcast outside of its assigned time slot and frequency windows.

Figure 3 provides a simplified block diagram of the user station 20 embodied in a computer 100 is provided. The computer 100 includes a processor complex 110 communicating with an advanced communications riser (ACR) card 215 over an IPB bus 210. The ACR card 215 hosts the hardware portion of the software modem 50. The hardware portion of the software modem 50 includes a PHY hardware unit 220 and a radio 230. Collectively, the PHY hardware unit 220 and the radio 230 form the PHY layer 70 of see Figure 1. The processor complex 110 executes program instructions encoded in a modem driver 240. Collectively, the processor complex 110 and the modem driver 240 implement the functions of the protocol layer 80 of Figure 1.

Thus, with respect to claim 1, a communications system, the invention comprises:

- a physical layer hardware unit (PHY layer 70 of Figure 1 or PHY hardware unit 220 and the radio 230 of Figure 3) adapted to communicate data over a communications channel (communications channel 40 of Figure 1), the physical layer hardware unit being adapted to receive unencrypted control codes and encrypted user data over the communications channel and transmit an upstream data signal over the communications channel based on the control codes; and
- a processing unit (processor complex 110) adapted to execute a software driver (modem driver 240) for interfacing with the physical layer hardware unit, the software driver including program instructions for implementing a protocol layer

to decrypt the user data and provide the upstream data to the physical layer hardware unit.

With respect to claim 9, a modem, the invention comprises:

- a physical layer hardware unit (PHY layer 70 of Figure 1 or PHY hardware unit 220 and the radio 230 of Figure 3) adapted to communicate data over a communications channel (communications channel 40 of Figure 1), the physical layer hardware unit being adapted to receive unencrypted control codes and encrypted user data over the communications channel and transmit an upstream data signal over the communications channel based on transmission assignments defined by the control codes.

With respect to claim 15, a method for configuring a transceiver, the invention comprises:

- receiving unencrypted control codes over a communications channel (communications channel 40 of Figure 1);
- receiving encrypted user data over the communications channel; and
- transmitting an upstream signal over the communications channel based on transmission assignments defined by the control codes.

With respect to claim 19, a modem, the invention comprises:

- means for receiving unencrypted control codes (PHY layer 70 of Figure 1 or PHY hardware unit 220 and the radio 230 of Figure 3) over a communications channel (communications channel 40 of Figure 1);
- means for receiving encrypted user data over the communications channel (protocol layer 80 of Figure 1 or processor complex 110 implementing modem driver 240 of Figure 3); and
- means for transmitting an upstream signal over the communications channel based on transmission assignments defined by the control codes (software modem 50 of Figure 1 or computer system 100 of Figure 3).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Are claims 1-19 anticipated under 35 U.S.C. § 102 (e) by U.S. Letters Patent 6,101,378 ("Barabash *et al.*")?

VII. ARGUMENT

A. BARABASH *ET AL.* FAILS TO ANTICIPATE ANY CLAIM

Independent claims 1, 9, 15, and 19 set forth, among other things, receiving unencrypted control codes and encrypted user data over a communications channel and transmitting an upstream data signal over the communications channel based on the control codes.

In contrast, Barabash simply describes a conventional cellular system with a mobile unit communicating with a base station. Barabash mentions sending encrypted user data over the communication channel, but fails to teach sending unencrypted control codes to a physical layer hardware unit for use in setting transmission assignments for transmitting an upstream data signal. The passages cited by the Office (Barabash, col. 6, lines 34-42 and col. 2, lines 18-38) to support this rejection broadly discusses exchanging control information between the base station and the mobile unit. There are no teachings regarding the format of the control information. Indeed, this control information is only mentioned in the claims section of Barabash, and no details are provided in the detailed description. Absent any teaching, it is not reasonable to assert that the control information is exchanged in unencrypted form.

Conventional systems, such as GSM, encrypt the user data and the control codes using the subscriber key installed on the Subscriber Identification Module (SIM) card of the mobile device. The user data and control codes are extracted from the receive signal by the physical layer hardware in encrypted form. Decryption of the control codes and user data is a protocol layer function that does not occur in the physical layer. Hence the physical layer hardware typically receives control codes from the protocol layer, not over the communication channel as set forth in claims 1, 9, 15, and 19.

Where anticipation is found through inherency, the Office's burden of establishing *prima facie* anticipation includes the burden of providing "...some evidence or scientific reasoning to establish the reasonableness of the examiner's belief that the functional limitation is an inherent characteristic of the prior art." *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1789 (Bd. Pat. App. & Int. 1987).

Inherency in anticipation requires that the asserted proposition *necessarily* flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. (BNA) 323, 326 (C.C.P.A. 1981); *Levy*, 17 U.S.P.Q.2d (BNA) at 1463-64; *Skinner*, at 1789; *In re King*, 231 U.S.P.Q. (BNA) 136, 138 (Fed. Cir. 1986). It is not enough that a reference could have, should have, or would have been used as the claimed invention. "The mere fact that a certain thing <u>may</u> result from a given set of circumstances is not sufficient." *Oelrich*, at 326, quoting *Hansgirg v. Kemmer*, 40 U.S.P.Q. (BNA) 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q.2d (BNA) 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; *see also Skinner*, at 1789. "Inherency... may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1789 (Bd. Pat. App. & Int. 1987), citing *In re Oelrich*, 666 F.2d 578, 581 (C.C.P.A. 1981).

The position taken by the Office in the Final Office Action is that because Barabash is mute as to how the control codes are exchanged, it must <u>necessarily flow</u> that they are unencrypted. Barabash describes exchanging the user data in encrypted form, but does not even mention the control codes at all, other than in the claims. Hence, Barabash completely lacks enablement for the proposition put forth by the Office. The only reasonable position that may be taken in light of the lack of any mention at all of how the control codes are exchanged, is that the control codes are exchanged in the conventional manner, which is to encrypt the user data and control codes and extract the user data and the control codes in the protocol layer. If Barabash were to contemplate processing the control codes in a different manner, it would have been mentioned at least once in the specification.

By not mentioning the control codes in the specification, Barabash is at best indeterminate as to how the control codes are exchanged. To support a rejection under 35 U.S.C. § 102 the asserted proposition must "necessarily flow" from the disclosure. Given that Barabash is completely silent on the format of the control codes, the proposition that they must be unencrypted is indefensible.

For this reason alone, Barabash fails to teach or suggest <u>receiving unencrypted control codes and encrypted user data</u> over a communications channel and transmitting an upstream data signal over the communications channel based on the control codes. Applicants respectfully requests the rejection of claims 1, 9, 15, 19, and all claims depending therefrom be reversed.

Independent claim 1 includes the additional feature of a software driver disposed between the physical layer hardware unit and a processing unit for interfacing therewith. A driver is employed by a general purpose processing device and provides a link between the processing device and the controlled hardware. The physical layer hardware configures the transmission parameters independent of the software driver, which receives and decrypts the user data in a protocol layer. This separation prevents the co-opting of the driver from affecting the transmission activities controlled by the physical layer hardware unit. In contrast, Barabash uses dedicated hardware and firmware, and as such, does not employ a software driver as commonly defined in the art. For this additional reason, claim 1, and all claims depending therefrom are allowable.

The Final Office Action asserts that because Barabash is silent as to the architecture used, it must necessarily flow that Barabash uses a software driver. Again, as Barabash does not mention a software driver at all, the only reasonable position is that a conventional approach is taken (*i.e.*, a hardware implementation). Barabash does not teach or suggest physical layer hardware for processing control codes that is distinct from a processing unit that executes a software driver for implementing a protocol layer and interfacing with the physical layer hardware.

Applicants separate the configuration of the transmission parameters by the physical layer hardware from the user data processing performed by the software driver, which receives and decrypts the user data in a protocol layer. This separation prevents the co-opting of the driver from affecting the transmission activities controlled by the physical layer hardware unit. As Barabash is completely silent as to how the user data and control codes are processed, the position that Barabash necessarily teaches a software driver that processes encrypted user data independently from physical layer hardware that employs unencrypted control codes is again indefensible. For this additional reason, claim 1, and all claims depending therefrom, are allowable.

For at least this additional reason, Applicants respectfully submit that claim 1 and all claims depending therefrom are not anticipated by Barabash, and the rejections of these claims under 35 U.S.C. 102(e) should be reversed.

Moreover, the dependent claims include additional features not taught or suggested by Barabash. The passages cited by the Office are general high level discussions, primarily in the

summary and claims sections, that do not even suggest, much less provide an enabling teaching of, the features set forth in the claims. Applicants can only assume that the Office seeks to establish that all of these features are inherent in Barabash.

An anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d (BNA) 1566, 1567 (Fed. Cir. 1990). "[I]t is incumbent upon the examiner to identify wherein each and every facet of the claimed invention is disclosed in the applied reference." *Ex parte Levy*, 17 U.S.P.Q.2d (BNA) 1461, 1462 (Pat. & Tm. Off. Bd. Pat. App. & Int. 1990). The Office has failed to provide such identification.

Claims 3, 11, and 17 include the additional feature of a demodulator in the physical layer hardware unit (claims 3 and 11) or a demodulating step (claim 17) to generate the control codes from the received signal samples. The Office merely cites a general discussion of the modem at column 3 as teaching this feature. This passage does not even mention control codes, much less extracting the control codes in the physical layer hardware. This feature is not inherent, as the control codes are typically generated by a protocol layer, not the physical layer hardware.

For at least this additional reason, Applicants respectfully submit that claims 3, 11, 17, and all claims depending therefrom are not anticipated by Barabash. Applicants request that the rejections of these claims under 35 U.S.C. 102(e) be reversed.

The plural deficiencies described above are fatal to the anticipation rejections set forth by the Office, since the law requires Barabash *et al.* to teach all of the cited limitations in order to anticipate. M.P.E.P. § 2131; *In re Bond*, 15 U.S.P.Q.2d (BNA) 1566, 1567 (Fed. Cir. 1990). Accordingly, Barabash *et al.* fails to anticipate any of claims 1-19. Applicants therefore request that these rejections be reversed.

VIII. CLAIMS APPENDIX

The claims that are the subject of the present appeal – claims 1-19 – are set forth in the attached "Claims Appendix."

IX. EVIDENCE APPENDIX

There is no separate Evidence Appendix for this appeal.

X. RELATED PROCEEDINGS APPENDIX

There is no Related Proceedings Appendix for this appeal.

XI. CONCLUSION

The rejections fail because the cited art of record fails to teach all the limitations of the claims. More particularly, the art of record fails to teach receiving unencrypted control codes and encrypted user data over a communications channel and transmitting an upstream data signal over the communications channel based on the control codes, as is recited in the independent claims and, by virtue of their dependence, the dependent claims. Thus, the art of record fails to anticipate claims 1-19 under 35 U.S.C. § 102 (e). Applicants therefore pray that the rejections be reversed and the claims be allowed to issue.

Respectfully submitted,

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APPENDIX
(Claims in Issue)

1. (Original) A communications system, comprising:

a physical layer hardware unit adapted to communicate data over a communications channel, the physical layer hardware unit being adapted to receive unencrypted control codes and encrypted user data over the communications channel and transmit an upstream data signal over the communications channel based on the control codes; and

a processing unit adapted to execute a software driver for interfacing with the physical layer hardware unit, the software driver including program instructions for implementing a protocol layer to decrypt the user data and provide the upstream data to the physical layer hardware unit.

2. (Original) The system of claim 1, wherein the control codes include at least one of a power level assignment, a frequency assignment, and a time slot assignment.

3. (Original) The system of claim 1, wherein the physical layer hardware unit includes:

an analog front end adapted to sample a received signal over the communications channel to generate received signal samples;

a downconverter adapted to process the received signal samples to generate a carrierless waveform including the user data; and

a demodulator adapted to demodulate the received signal samples to generate the control codes.

4. (Original) The system of claim 3, wherein the physical layer hardware unit includes control logic adapted to receive the control codes and configure the downconverter based on the control codes.

5. (Original) The system of claim 4, wherein the control codes include at least one of a power level assignment, a frequency assignment, and a time slot assignment.

6. (Original) The system of claim 3, wherein the physical layer hardware unit includes:

an upconverter adapted to receive the upstream data and generate an upstream digital signal, wherein the analog front end unit is further adapted to receive the upstream digital signal and generate the upstream data signal; and

control logic adapted to receive the control codes and configure the upconverter based on the control codes.

7. (Original) The system of claim 1, wherein the processing unit comprises a computer.

8. (Original) The system of claim 7, wherein the computer includes:

a processor complex adapted to execute the program instructions in the software driver;

a bus coupled to the processor complex; and

an expansion card coupled to the bus, the expansion card including the physical layer hardware.

9. (Original) A modem, comprising a physical layer hardware unit adapted to communicate data over a communications channel, the physical layer hardware unit being adapted to receive unencrypted control codes and encrypted user data over the communications channel and transmit an upstream data signal over the communications channel based on transmission assignments defined by the control codes.

10. (Original) The modem of claim 9, wherein the control codes include at least one of a power level assignment, a frequency assignment, and a time slot assignment.

11. (Original) The modem of claim 9, wherein the physical layer hardware unit includes:

an analog front end adapted to sample a received signal over the communications channel to generate received signal samples;

a downconverter adapted to process the received signal samples to generate a carrierless waveform including the user data; and

a demodulator adapted to demodulate the received signal samples to generate the control codes.

12. (Original) The modem of claim 11, wherein the physical layer hardware unit includes control logic adapted to receive the control codes and configure the downconverter based on the control codes.

13. (Original) The modem of claim 12, wherein the control codes include at least one of a power level assignment, a frequency assignment, and a time slot assignment.

14. (Original) The modem of claim 11, wherein the physical layer hardware unit includes:

an upconverter adapted to receive the upstream data and generate an upstream digital signal, wherein the analog front end unit is further adapted to receive the upstream digital signal and generate the upstream data signal; and

control logic adapted to receive the control codes and configure the upconverter based on the control codes.

15. (Original) A method for configuring a transceiver, comprising:

receiving unencrypted control codes over a communications channel;

receiving encrypted user data over the communications channel; and

transmitting an upstream signal over the communications channel based on transmission assignments defined by the control codes.

16. (Original) The method of claim 15, wherein transmitting the upstream signal comprises transmitting the upstream signal based on at least one of a power level assignment, a frequency assignment, and a time slot assignment.

17. (Original) The method of claim 15, further comprising:

sampling a received signal over the communications channel to generate received signal samples;

downconverting the received signal samples to generate a carrierless waveform including the user data; and

demodulating the received signal samples to generate the control codes.

18. (Previously Presented) The method of claim 17, wherein downconverting the received signal samples to generate the carrierless waveform including the user data comprises downconverting the received signal samples based on the control codes.

19. (Original) A modem, comprising:

means for receiving unencrypted control codes over a communications channel;

means for receiving encrypted user data over the communications channel; and

means for transmitting an upstream signal over the communications channel based on transmission assignments defined by the control codes.